REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Final Office Action of January 19, 2011.

Reconsideration of the Application is requested.

Claims 24-31, 33-50, 52, 53, and 55 remain pending in the application.

Claims 1-23, 32, and 51 have been cancelled without prejudice and disclaimer.

Claims 24, 26-31, 33-38, 41, 44-46, 48-49, and 52-55 have been amended.

Support for Claim Amendment:

Support for the amendment to Claim 1 is provided by the specification as a whole, and, more particularly, by FIGURE 2 and paragraphs [0031]-[0032].

REJECTIONS UNDER 35 U.S.C. § 102

I. Heck – Claims 24-26, 30-36, 40, 50, 52, and 55

Claims 24-26, 30-36, 40, 50, 52, and 55 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2003/0183916 to Heck et al. (hereinafter, "Heck"). This rejection is respectfully traversed in light of the following remarks.

Claim 24 now recites a method for producing a micro electro-mechanical device package encompassing the steps of forming a thermally decomposable photodefinable sacrificial layer on a substrate of a micro electro-mechanical device. The sacrificial layer encapsulates a portion of the micro electro-mechanical device. The method further includes image-wise exposing said photodefinable sacrificial layer where said layer is patterned and forming a contiguous overcoat layer around the sacrificial layer where the overcoat layer encompasses a photodefinable polymer. The method further encompasses thermally decomposing the sacrificial layer where decomposes molecules of the sacrificial layer permeate through the

contiguous overcoat layer and where a gas cavity is formed where the thermally decomposable sacrificial layer was formed. The overcoat layer provides an airtight enclosure around the gas cavity.

There is no teaching or suggestion of a method for producing a micro electro-mechanical device package as presently claimed.

Heck discloses packaged microelectromechanical systems that are formed by: applying thermally decomposable layers (15, 25) over a semiconductor structure (12) so as to cover a microelectromechanical system device (18); forming a cover (20) over the thermally decomposable layers (15, 25); making the cover (20) porous; thermally decomposing the thermally decomposable layers (15, 25) such that the thermally decomposed layers ***pass through*** the porous cover (20) to form a cavity (22); and applying a sealing material (34) over the porous cover (20) so as to seal the cavity (22) (Heck, Abstract, FIGURE 9, and paragraphs [0015], [0018] and [0021]).

There are clear distinctions between this reference and the presently claimed method. In the method of Applicants' claims, decomposed molecules of the thermally decomposed sacrificial layer ***permeate through*** the overcoat layer. Since the decomposed molecules permeate therethrough, the overcoat layer of Applicants' present claims is necessarily ***a contiguous overcoat layer*** that is without "openings" or is non-porous. Attention is further directed to the specification and drawing figures (e.g., FIGURE 3), in which the overcoat layer is depicted as being a contiguous and without openings (non-porous).

Moreover, Heck discloses "the sacrificial layer may include a thermally decomposing film". This is not the same as "an image-wise exposing said photodefinable sacrificial layer where said layer is patterned as presently claimed.

Therefore, Heck provides no disclosure or suggestion with regard to a method of producing a microelectromechanical device package which encompasses forming ***a thermally decomposable photodefinable sacrificial layer***, image-wise exposing said photodefinable sacrificial layer

where said layer is patterned and forming ***a contiguous overcoat layer*** around the sacrificial layer and thermally decomposing the sacrificial layer where decomposed molecules of the sacrificial layer ***permeate through*** the overcoat layer as presently claimed. Rather, the thermally decomposed layers ***pass through*** the porous cover (20) to form a cavity (22).

Accordingly, Claim 24 and Claims 25-31, 33-50, and 52-55 dependent therefrom distinguish over Heck. Reconsideration and withdrawal of the present rejection are respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 103:

I. Heck in view of Freidoff, Claims 27-29

Claims 27-29 were rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of U.S. Publication No. 2003/0155643 to Freidhoff et al. (hereinafter "Freidhoff"). This rejection is respectfully traversed in light of the following remarks.

Freidhoff discloses a method of manufacturing a microelectromechanical systems device that includes: forming a first sacrificial layer (40) on a substrate (24); forming a moving member (44) on the first sacrificial layer (40); forming a second sacrificial layer (50) over the moving member (44); forming a cover (54) over the second sacrificial layer (50); and removing the first and second sacrificial layers through opening (56) in the cover (54). The first and second sacrificial layers are removed by means of an agent (e.g., a solvent, stripper or reactive gas) that is introduced through the opening (56) in the cover (54). The cover (54) may be a film of silicon oxynitride, formed by PECVD (Freidhoff, Abstract, FIGURE 7, and paragraphs [0022]-[0027], and [0032]).

Heck has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Freidhoff provides no disclosure, teaching or suggestion with regard to thermally decomposing the sacrificial layers thereof. As such, since Heck

and Freidhoff are directed to disparate methods of forming cavities, neither provides the requisite disclosure that would motivate a skilled artisan to combine them in an attempt to somehow arrive at the method of Applicants' present claims.

Even if Heck and Freidhoff were combined, such a combination would necessarily result in a method that involves sacrificial material ***passing through*** a cover having openings therein, or a porous cover. As such, the combination of Heck and Freidhoff would not, as it could not, result in a method of producing a microelectromechanical device package which encompasses forming a contiguous overcoat layer around the sacrificial layer and thermally decomposing the sacrificial layer where decomposed molecules of the sacrificial layer ***permeate through*** the contiguous overcoat layer as presently claimed.

Accordingly, Claims 27-29 distinguish over Heck in view of Freidhoff. Reconsideration and withdrawal of the present rejection are respectfully requested.

II. Heck in view of Gallagher, Claim 37

Claim 37 was rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck in view of U.S. Publication No. 2004/0137728 to Gallagher et al., (hereinafter "Gallagher"). This rejection is respectfully traversed in light of the following remarks.

Gallagher discloses a method of forming air gaps within a solid structure that includes: forming a dielectric layer (10) on a substrate (5); forming metal lines (15) on the dielectric layer (10); disposing a sacrificial material (20) on the dielectric layer (10) and between metal lines (15); disposing a ***porous overlayer*** (25) over the sacrificial material (20) and metal lines (15); and decomposing the sacrificial material (20) by heating, resulting in the formation of volatile fragments that ***pass through*** the ***porous overlayer*** (25), thereby forming air gaps (21). See, for example, Figures 1A-1D; and paragraphs [0021], [0048] and [0061] of Gallagher.

Heck has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which

the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Gallagher does not serve to overcome the deficiencies of Heck. The combination of Heck and Gallagher would necessarily result in a method that involves decomposed material ***passing through a porous overlayer***. As such, the combination of Heck and Gallagher would not, as it could not, result in a method of producing a microelectromechanical device package which encompasses forming a contiguous overcoat layer around the sacrificial layer and thermally decomposing the sacrificial layer where decomposed molecules of the sacrificial layer ***permeate through*** the contiguous overcoat layer as presently claimed.

On pages 9 and 10 of the Final Office Action, it is argued that Gallagher discloses forming a released mechanical structure before the sacrificial material is formed. Applicants disagree and respectfully submit that this represents a mischaracterization of Gallagher. The metal lines (15) of the solid structure disclosed by Gallagher are not and do not reasonably represent free-standing or released mechanical structures, since they are each held abuttingly between dielectric layer (10) and porous overlayer (25). See, for example, FIGURES 1A through 1D of Gallagher. For purposes of comparative illustration, attention is directed to the micro electro-mechanical system device package (100) depicted in FIGURE 1 of Applicants' specification, which includes a free-standing or released micro electro-mechanical system structure (110). See also, paragraph [0025] on page 4 of Applicants' specification.

Accordingly, Claim 37 distinguishes over the Heck in view of Gallagher. Reconsideration and withdrawal of the present rejection are respectfully requested.

III. Heck in view of Silverbrook, Claims 38-39:

Claims 38 and 39 were rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck in view of U.S. Publication No. 2003/0122227 to Silverbrook et al., (hereinafter "Silverbrook"). This rejection is respectfully traversed in light of the following remarks.

Silverbrook discloses a micro-machined accelerometer package that includes a hollow molded protective cap (e.g., 201) that is subsequently bonded to the surface of a pre-existing accelerometer so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. The micro-machined accelerometer package of Silverbrook may also include a copper lead frame, and a protective layer encapsulating the entire assembly (e.g., FIGURE 23). See, for example, the Abstract, paragraphs [0001], [0003]-[0008], [0068] and [0069], and FIGURE 23 of Silverbrook.

Heck has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Silverbrook discloses the subsequent placement and bonding of a previously molded hollow protective cap onto the surface of a pre-existing accelerometer, so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. Silverbrook provides no disclosure or teaching with regard to forming a cavity of thermal decomposition of thermally decomposable layers. As such, neither Heck nor Silverbrook provide the requisite disclosure that would motivate a skilled artisan to combine or otherwise combine their disclosures in an attempt to somehow arrive at Applicants' claimed method.

Silverbrook does not cure the deficiencies of Heck. The combination of Heck et al. and Silverbrook would necessarily result in a method that involves decomposed material ***passing through*** a ***perforated or porous cover***. As such, the combination of Heck and Silverbrook would not, as it could not, result in a method of producing a microelectromechanical device package which encompasses forming a contiguous overcoat layer around the sacrificial layer and thermally decomposing the sacrificial layer where decomposed molecules of the sacrificial layer ***permeate through*** the contiguous overcoat layer as presently claimed.

Accordingly, Claims 38 and 39 distinguish over Heck in view of Silverbrook. Reconsideration and withdrawal of the present rejection are respectfully requested.

IV. Heck in view of Partridge, Claims 41 and 42:

Claims 41 and 42 were rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck in view of U.S. Publication No. 2004/0245586 to Partridge et al., (hereinafter "Partridge"). This rejection is respectfully traversed in light of the following remarks.

Partridge discloses forming microelectromechanical systems and devices that include inorganic encapsulating layers (e.g., 28a, 28b, and 28c) which reside above an underlying substrate (e.g., 14). The microelectromechanical systems and devices of Partridge include structures that are interposed between the inorganic encapsulating layers and the underlying substrate, such as a field area (22), a contact area (24) and a non-etched inorganic sacrificial layer (30). Partridge discloses etching and removing sacrificial layers (e.g., 30 and 32) through vents (e.g., 36). See, for example, the Abstract; paragraphs [0001], [0010], [0046]-[0048], [0056], and [0092]-[0093]; and Figures 3 and 12 of Partridge.

Heck has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Partridge discloses etching and removing sacrificial layers (e.g., 30 and 32) through vents, and provides no disclosure or teaching with regard to thermal decomposition of the sacrificial layers. As such, neither Heck nor Partridge provide the requisite disclosure that would motivate a skilled artisan to combine or otherwise modify their disclosures in an attempt to somehow arrive at Applicants' claimed method.

Partridge does not address or otherwise overcome the deficiencies of Heck. Even if Heck and Partridge were combined, the method of Applicants' claims would not result therefrom. Such a combination would necessarily result in a method of producing a microelectromechanical device package

which encompasses forming a contiguous overcoat layer around the sacrificial layer and thermally decomposing the sacrificial layer where decomposed molecules of the sacrificial layer ***permeate through*** the contiguous overcoat layer as presently claimed

Applicants respectfully submit that the remarks on page 13 of the Office Action with regard to claim 42 represent a mischaracterization of Partridge. Partridge discloses forming an encapsulation layer (e.g., 28c) for purposes of sealing chamber (26) and thereby providing a barrier to the diffusion of a fluid (42) residing within chamber (26). See, for example, Figure 12 and paragraph [0094] of Partridge. As such, Heck and Partridge either alone or in combination, do not disclose or suggest the method of Applicants' present claims, which may further include under claim 42 the formation of a vacuum-packed enclosure around the gas cavity.

Accordingly, Claims 41 and 42 distinguish over Heck in view of Partridge. Reconsideration and withdrawal of the present rejection are respectfully requested.

V. Heck and Partridge in view of Silverbrook, Claims 43-45 and 47-49:

Claims 43-45 and 47-49 were rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck and Partridge in view of Silverbrook.

Heck, Partridge, and Silverbrook have each been discussed previously herein. A lack of motivation to combine Heck with Partridge or Silverbrook, has been discussed previously herein. Partridge discloses etching and removing sacrificial layers through vents. Silverbrook discloses the subsequent placement and bonding of a previously molded hollow protective cap onto the surface of a pre-existing accelerometer, so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. Silverbrook provides no disclosure or teaching with regard to forming a cavity by removing sacrificial layers (e.g., by etching and removal through vents). As such, neither Partridge nor Silverbrook provides the requisite disclosure that would motivate a skilled artisan to combine or otherwise

modify their respective disclosures in an attempt to arrive at Applicants' claimed method.

Partridge and/or Silverbrook do not overcome or otherwise address the deficiencies of Heck. The combination of Heck, Partridge, and Silverbrook would necessarily result in a method that involves sacrificial material ***passing through*** a cover having vents therein, or a porous cover. Heck, Partridge, and Silverbrook, alone or in any combination, do not disclose or teach Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer ***permeating through*** a previously applied overcoat layer, which is contiguous and non-porous.

Accordingly, Claims 43-45 and 47-49 distinguish over Heck, and Partridge, in view of Silverbrook. Reconsideration and withdrawal of the present rejection are respectfully requested.

VI. Heck and Partridge, in view of Barth, Claim 46:

Claim 46 was rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck and Partridge, in view U.S. Publication No. 2006/0014374 to Barth et al., (hereinafter "Barth").

Barth discloses a layer arrangement and a process of forming the layer. arrangement that involves sequentially applying or forming a layered structure having decomposable structures (e.g., 112) between upper (e.g., 124) and lower (e.g., 104) layers, and thermally decomposing the decomposable structures to form cavities (e.g., 128) residing between the upper and lower layers. The lower layer (e.g., 104) and, accordingly, the whole layered structure, is formed over or on a silicon wafer (e.g., 100). See, for example, the abstract, Figures 1E, 1F and 1G, and paragraphs [0056] through [0062] of Barth.

Heck and Partridge have been discussed previously herein with regard to a lack of motivation to combine their disclosure, and the failure of such a combination to result in the method of Applicants' claimed method. Heck and Partridge relate to microelectromechanical system devices. Barth provides no disclosure, teaching or suggestion with regard to encapsulating

a microstructure, such as a microelectromechanical systems device, in a decomposable structure. As such, there is no motivation to combine Barth with Heck and/or Partridge.

In addition, a combination of Partridge and Barth would render the process of Partridge inoperable. Partridge discloses **sequentially** annealing the micromachined mechanical structure **after** the first (30) and second (32) sacrificial layers have been removed. See paragraph [0091] of Partridge. Barth describes their process as necessarily involving performing an annealing process **concurrently** with removal of the sacrificial structure (112). See, for example, paragraph [0062] of Barth. In addition, Partridge discloses that annealing the micromachined mechanical structure results in densifying and sealing of the permeable / semi-permeable first encapsulation layer (28a). As such, modifying Partridge to include the concurrent annealing-sacrificial structure removal process of Barth would render Partridge inoperable, since such a concurrent annealing-sacrificial structure removal process would seal the first encapsulation layer (28a), thus preventing removal of sacrificial structures, such as the first (30) and second (32) sacrificial layers, therethrough, as would be recognized by a skilled artisan.

Barth does not address or otherwise overcome the deficiencies of Heck and/or Partridge. Heck, Partridge, and Barth, alone or in any combination, do not disclose or suggest the method of Applicants' claims.

Accordingly, Claim 46 distinguishes over Heck and Partridge in view of Barth. Reconsideration and withdrawal of the present rejection are respectfully requested.

VII. ***Heck in view of Chanchani, Claims 53 and 54:***

Claims 53 and 54 were rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck in view of U.S. Publication No. 2007/0158787 A1 to Chanchani et al., (hereinafter "Chanchani"). This rejection is respectfully traversed in light of the amendments herein and the following remarks.

Chanchani discloses a microsystem-on-a-chip device that includes, a bottom wafer (220), and an upper wafer (240), that are glued together by an interconnect layer (230) that includes a dielectric polymer (231). The microsystem-on-a-chip device includes interconnect circuitry (223, 232) and microsystems devices (222) that are **embedded** in the dielectric polymer (231) of the interconnect layer. See, for example, the Abstract, FIGURE 3, and paragraphs [0022]-[0027] and [0033] of Chanchani.

Heck is directed to microelectromechanical systems, technology and devices. Chanchani is directed to microsystem-on-a-chip technology and devices. Chanchani provides no disclosure, teaching or suggestion with regard to microelectromechanical systems, technology and devices. Heck et al. provides no disclosure, teaching or suggestion with regard to microsystem-on-a-chip technology and devices. Chanchani provides no disclosure, teaching or suggestion with regard to forming a cavity (e.g., 22 of Heck) that contains a microelectromechanical systems device (e.g., 18 of Heck). Heck and Chanchani are each directed to disparate and distinguishable technologies that are not applicable to each other, as would be recognized by a skilled artisan. As such, neither Heck nor Chanchani provides the requisite disclosure that would motivate a skilled artisan to combine or otherwise modify their disclosures in an attempt to somehow arrive at Applicants' presently claimed method.

Even if Heck and Chanchani were combined, such a combination would provide an inoperable result, and, in particular, render Heck inoperable for its intended purpose. A combination of Heck and Chanchani would result in the microelectromechanical systems device (18) of Heck being embedded in a dielectric polymer material, rather than residing in a cavity (22).

If proposed modifications render a reference inoperable for its intended purpose, then there is no suggestion or motivation to make the proposed modification, and, accordingly, the proposed modification would not be obvious. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Similarly, according to the MPEP, the claimed combination of

references used to ground an obviousness rejection may not change the principle of operation of the primary reference or render the reference inoperable for its intended purpose. MPEP §§ 2143.01 and 2145(III).

As discussed above, a combination of Heck and Chanchani would result in an inoperable microelectromechanical systems device in which the microelectromechanical systems device thereof is embedded in a dielectric polymer, rather than residing in a cavity, as would be recognized by a skilled artisan. As such, a combination of Heck and Chanchani would not, as it could not, result in the method of Applicants' present claims.

UUnder the examination guidelines for determining obviousness under 35 U.S.C. § 103 of the Manual of Patent Examining Procedure (MPEP), "[a]scertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole." MPEP § 2141.02, page 2100-123, Rev. 6, Sept. 2007. "In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP §2141.02 (emphasis in original), citing: *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983).

Under MPEP § 2143.03, all claim limitations must be considered. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). MPEP § 2143.03, page 2100-142, Rev. 6, Sept. 2007.

Accordingly, Claims 53 and 54 distinguish over Heck in view of Chanchani. Reconsideration and withdrawal of the present rejection are respectfully requested.

CONCLUSION

In light of the amendments herein and the preceding remarks, Applicants' presently pending claims are believed to define an invention that is unanticipated, unobvious, and, hence, patentable. Reconsideration of the rejections and allowance of all of the presently pending claims are respectfully requested.

Respectfully submitted,

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